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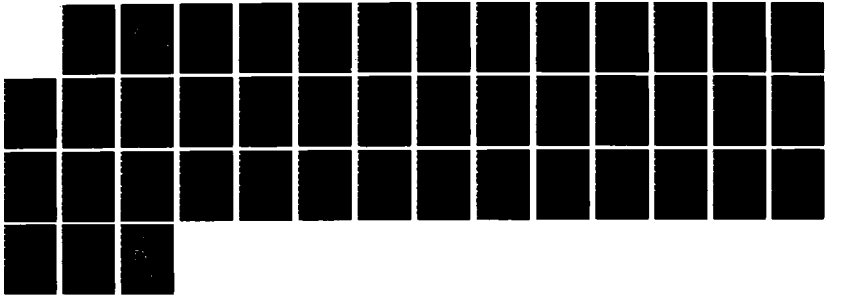

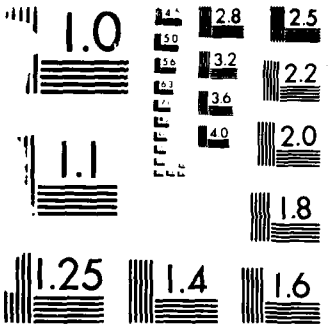

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Needs Assessment of Corps Planning Information Management Systems

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Contract Report 85-C-5

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)* This report describes what planning managers within the Corps of Engineers are currently doing, and what they would like to do, to manage information pertinent to Corps planning activities. A series of interviews with Corps planning managers at several offices and a review of documentation on information management systems used by Corps planners served as the basis for this report. An executive summary documenting the major findings, conclusions, and recommendations is included in the report.

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NEEDS ASSESSMENT OF CORPS PLANNING INFORMATION MANAGEMENT SYSTEMS

CONTRACT NO. DACW72-84-C-0004

Task Order No. 3

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EXECUTIVE SUMMARY

INTRODUCTION

The primary objective of this study was to document the current and desired information management activities of "planning managers" within the Corps of Engineers, as these activities relate to the management of planning studies, with special emphasis on the uses of microcomputers.

The work was carried out through site visits and in-depth interviews with planning managers (Planning Chiefs, Branch and Section Chiefs, and Project Managers) at the following Corps of Engineers' District Offices: Fort Worth, Huntington, Los Angeles, New York, San Francisco, and Vicksburg. Interviews at the Division level were carried out at the Lower Mississippi Valley Division, Ohio River Division, and South Pacific Division. All interviews were focused on the activities within the Planning Divisions at the respective Districts and Divisions. Additional interviews were conducted at the Waterways Experiment Station and the Construction Engineering Research Laboratory in order to determine how other groups were supporting the management information function with microcomputers.

Interviews were carried out jointly by Mr. Michael Walsh, of the Institute for Water Resources, and by Dr. Richard Males, contractor on the study.

FINDINGS

Major findings are as follows:

Information Needs

1) The major expressed desire, on the part of planning managers, is for systems that track obligations and expenditures. Meeting scheduled obligation and expenditure targets is viewed as a high management priority, and a variety of systems have evolved at different Planning Divisions to handle this information tracking. In general, the tracking systems that exist are those that support areas of management concern, such as meeting suspense dates, or hitting expenditure targets.

2) The management information needs of the "service" branches (Environmental Resources, Economics) that are not generally managing their own studies, but rather are providing services, are distinctly different from those of the branches that have their own studies. The service branches look to managing and scheduling the workload on their limited personnel, and to providing cost estimates for their services, as fundamental management information needs.

3) Most upward reporting into Corps-wide management systems is viewed as having little management information value by the project manager. As a consequence, there are frequently "two sets of books," one for upward reporting and one for internal management. Issues of lack of timeliness of COEMIS F+A reports are mentioned frequently as a problem.

4) The formal use of network management techniques is limited; in general, an activity diagram will be developed at the beginning of a study, and possibly inserted into RA/PM, but the network itself is seldom revised as schedules are modified. There are varied expectations of the PRISM system, with some individuals expecting it to be a major enhancement, while others are not confident of its success. There is an emerging interest in use of microcomputer-based network management tools, primarily for larger projects.

5) Most project managers feel that a monthly tracking cycle is sufficient for managing projects, but in some cases (particularly on smaller, shorter-term, lower-budget projects), two-week cycles are desired.

6) There is often a mismatch between the reporting cycles used by the Corps-wide systems and the internal management control systems used within a District or Division.

7) There is, in general, only limited knowledge on the part of consumers of management information as to how that information flows, particularly through the large Corps-wide systems.

8) There is almost no mention, on the part of Planning Division personnel, of the desire for systems (automated or manual) for quality control and management of the technical content of planning efforts, and little evidence of any such formal systems. Management of the content of planning studies, rather than the administrative aspects, is not identified as a particular problem (or at least one that is amenable to formal solutions).

Strategies

1) Two basic "models" of management information tracking are prevalent:

a) Each project manager is expected to maintain administrative records and fulfill both a technical and administrative role;

or

b) A centralized group or a single individual is given the function of supporting the project manager in administrative aspects, with the project manager serving in a primarily technical role. Often, the Branch or Section Chief fulfills this function.

As administrative demands increase, the latter approach appears to be increasingly popular.

2) "Local" computer applications, based on the Harris or on microcomputers, are widely used to support information tracking for planning management. Typical applications include those that track and compare monthly scheduled, obligated, and actual expenditures; track suspense dates on action items; keep records of travel and training; and provide cost estimates for the "service-oriented" branches. Many Planning Divisions are investigating, or have accomplished, the routine "downloading" of information from Corps-wide information systems such as COEMIS F+A into microcomputers, where this information is manipulated to provide management reports.

3) Each Planning Division is designing its own solution for providing management information in areas that are generally of common concern across Districts (e.g., tracking scheduled obligations and expenditures, travel, training, and suspense dates). However, there is a great deal of variety in the specifics of the approach within each Planning Division. There is little interchange of information relative to such systems between Planning Divisions.

4) The Information Systems Planning (ISP) process has been adopted in some Districts, and not in others. Where the ISP process has been adopted, commitment to it seems to be confined primarily to the group that is actually conducting the process, rather than to the organization as a whole. Expectations for the results of the ISP are seen as long-term, rather than for handling any immediate information needs.

5) While the ISP concept meets with varying responses in different locations, there is little question that planning managers do look upon information as a commodity and, at the higher levels, are investing significant resources in tracking information they feel is important for the conduct of their activities.

Systems

1) Managers are turning increasingly to microcomputers and to local (within Branch, or Division) sources of information support, rather than looking to outside sources (such as ADP). ADP, with some exceptions, is not viewed (due to resource commitments and attitude) as capable of supporting such "local" activities. Often, "experts" within the Branch or Division, who have acquired skills in one or more particular areas (e.g., Lotus, dBase III, etc.), routinely fulfill this function (in addition to their normal duties).

2) There is a general desire to standardize on IBM or IBM-compatible microcomputers. Almost all microcomputer applications for managing planning information make use of commercial applications packages, in particular Lotus 1-2-3, Symphony, and/or dBase III. Operating groups tend to adopt one or the other of these packages for the majority of activities.

3) There is a good deal of duplication of effort in terms of development of microcomputer-based tracking systems. Parallel paths of applications

development exist in many Districts. There is little or no information-sharing between Districts, and frequently there is minimal information-sharing between Branches. There is little structure in place for such information-sharing.

4) There is essentially no documentation of the microcomputer-based systems that have been developed for information tracking. Many of these systems have been developed by, and are run by, a single individual. The level of expertise of these system developers varies widely. Many of the systems are modifiable only with great effort. Higher management levels show little awareness of, or concern for, issues of documentation and applications maintenance.

CONCLUSIONS

Information Needs

1) Independent of any centralized efforts within the Corps, Planning Divisions are using microcomputers to support tracking of management information on planning studies, through development of "local" systems. This activity is in response to a perceived need for specific kinds of information in order to respond to the things that are priorities within the Corps, such as meeting suspense dates and hitting expenditure targets. The existing Corps-wide systems are not seen as providing this information in a timely manner. The development of these "local" systems is going on in parallel in a number of Districts.

2) Most of the local systems that deal with fiscal information currently implement, or are moving in the direction of, "downloading" information from the large Corps-wide systems into microcomputer data base or spreadsheet applications, where the information can be "massaged" and presented as desired. The Corps-wide systems are seen as the only place where all of the information "comes together," particularly when work involves different divisions (e.g., Engineering performing work on a Planning study).

Strategies

1) The basic "model" of information management that is desired at the planning manager level is one in which "local" systems are maintained on microcomputers, within the Division or Branch, and information is uploaded and downloaded to and from the Corps-wide upward reporting systems. There is little belief that the Corps-wide systems (with the possible exception of PRISM) can be made responsive to the needs of the planning manager.

   Most current management information systems are seen as "large-machine" oriented and as upward reporting in nature. The attitude of ADP is similarly viewed as large-machine, rather than microcomputer, oriented.

2) There is no apparent or evolving policy within the Corps that deals with the "reality" of microcomputers and the changes that they have made and will make in the workplace. Some isolated individuals, primarily at middle levels in the laboratories, express concern and have given consideration to this issue, but in general it is ignored.

Systems

1) There is no mechanism for information transfer on planning management applications of microcomputers, but there is a great deal of commonality among the applications that are being developed.

2) Most of the microcomputer-based applications that have been developed to provide information management are highly "personalized" systems, developed and used by one individual, who has all of the resident knowledge about the inner workings of that system, even if the system provides information to others. These systems are largely undocumented and hence are vulnerable to situations in which the developer leaves the organization. This should be, but is not, an area of major concern to higher levels of management.

3) While general overviews and computer literacy training, such as the "Microcomputers in Planning" course, are available, there is no good mechanism for delivering specific training on development of microcomputer-based application systems. There are a wide variety of skill levels on the part of individuals currently developing such systems, but most are largely self-taught. The issue of there "not being enough time" to learn the capabilities of the applications tools available is raised frequently.

4) There is almost no concern for "good software engineering," i.e., the development of applications that are well documented, easily transferable and modifiable, adequately tested, and easy to maintain and use. While Army Regulation 18-1 on Army Automation Management provides clear direction towards good software engineering, there is no application of this concept in practice at the microcomputer level, and the associated skills are essentially unknown within the user community of non-ADP professionals currently developing the microcomputer-based systems.

RECOMMENDATIONS

Information Needs

1) There is little "research," per se, that should be done relative to the development of specific microcomputer information management tools. This development is taking place, on an ad hoc basis, at the Planning Division level, and it is unlikely that Planning Divisions would view any externally developed systems with any more favor than they currently do. There are, however, a number of Activities that, while not strictly "research," are essential to the development and use of more effective

planning management information tools, and there is, at present, no center for such activities within the planning activities in the Corps. These activities center around information and technology transfer, ongoing high-level support, development of training and skills models, and development of software engineering skills at the local level.

Strategies

1) There is a vital need for an information/technology transfer function in this area. An active support center, based on the model of the Construction Management Team within CERL, could provide important services to FOA Planning activities. In particular, activities should include:

   - conducting a workshop devoted strictly to the development and use of "local" systems, to be structured as an information-sharing activity. As there is a great deal of ongoing activity in this area at present, the workshop should be conducted as soon as possible.

   - formation of a user's group in this area (which might be a potential outgrowth of the workshop activities).

   - creation of mechanisms for ongoing information-sharing beyond the existing Planners Bulletin Board System, in particular a routine newsletter.

   - fostering, through teaching, example, and consulting, the use of good software engineering practice.

   - development of a "library" of general-purpose tools and techniques for use by applications developers to promote standardization and eliminate duplication of effort.

2) The Corps should consider the long-term impact that microcomputer usage (for both management information and specific technical applications activities) will have on the character of work and the workplace in terms of organization, support, training, career path of individuals, and management of computer-related activities. At present, there is little evidence that these issues are being seriously considered.

3) Development of a reasonable training model and skills acquisition path relative to microcomputer applications is an important near-term consideration. Most training is currently ad hoc and unguided. Users of applications systems tend to learn techniques needed while they are developing applications, rather than through formal training.

Systems

1) It is essential that attention be given to the issue of documentation, usability, testing, and transferability of applications. It is apparent that more and more individuals will be developing "local" systems.

These systems are at present highly personalized, i.e., developed and used by a single individual. In many cases, these systems are not simply used by one individual -- in particularly those dealing with management information, but are providing a broader service function. The basic design of such systems may be too cumbersome and limited in scope to satisfy immediate needs. The systems, undocumented as they are, are vulnerable to personnel leaving. Specific research should be devoted to determining how best, within the realities of the Corps organization and structure, to ensure that there is no proliferation of poorly designed, undocumented, personalized systems.

One possible mechanism for initiating this effort would be a pilot project, focused on development of well- structured management information systems based on microcomputers, using the administrative management information needs project of IWR itself as a test-bed for development of such systems. This pilot would use good software engineering techniques - top-down programming, programmer teams (group efforts as opposed to individual efforts), and more formal procedures for development, testing, and documentation. Experience gained in the development effort (both positive and negative) might then serve as a model for similar development efforts elsewhere within the Corps.

2) Opportunities may exist for exploration of the uses of advanced technologies, in particular "expert systems," to develop a "corporate knowledge base" related to quality control of information content in planning studies. While management of technical content was not identified as a problem, and was not the primary focus of this study, many individuals noted problems of increasingly junior staffing levels, as older, more experienced higher grades are transferred or retired. The emerging field of expert systems might serve as a vehicle to capture such skilled knowledge related to the technical conduct of planning and make it available to others. Research devoted to an initial attempt at developing a planning knowledge base and prototype expert system in selected, defined areas (e.g., what should we worry about in population or land use projections) would serve a useful purpose in determining the feasibility of such approaches within the Corps.

TECHNICAL REPORT

INTRODUCTION

This report describes the work carried out in "Needs Assessment of Corps Planning Information Management Systems," Contract DACW72-84-C-0004, Task Order No. 3, performed by Planning & Management Consultants, with Dr. Richard M. Males of RMM Technical Services, Inc., 3319 Eastside Avenue, Cincinnati, Ohio 45208, acting as principal investigator.

The work was undertaken on the hypothesis that existing information management systems within the Corps are not directed at the day-to-day needs of planning project managers, and that the advent of microcomputers and associated low-cost commercial software (spreadsheet, data base, project management, etc.) could provide a vehicle for fulfilling such information needs.

As an initial step in determining whether any such microcomputer-based tools could or should be developed to satisfy broad-scale, Corps-wide needs, it was recognized that a "needs assessment" should be carried out. The purpose of the needs assessment was to determine, through interviews with planning project managers, what *current* systems are in place and what are the felt needs and desires on the part of such planning managers for new systems.

On-site interviews were carried out at 11 FOA's (nine District or Division-level Planning Divisions, and the Waterways Experiment Station and Construction Engineering Research Laboratory) during the period March through July 1985. These interviews were conducted jointly by Mr. Michael R. Walsh of the Institute for Water Resources, Corps of Engineers (who served as project officer for this study), and by Dr. Richard M. Males, principal investigator. Interview sites were selected by Mr. Walsh to provide a broad spectrum of Corps Planning Division involvement with management information systems in general and microcomputer-based systems in particular. Wherever possible, documentary information (sample reports, internal studies of management information needs, etc.) used by Planning Divisions was obtained at the interview sites visited. The overall report content is based upon the results of these interviews and review of the associated documents. In the following sections, a description of the methodology used in the study is provided. This is followed by a brief description of the major Corps-wide systems in use and by summary information relating to each interview. In order to provide some "flavor" of the feelings and attitudes of individuals interviewed, a variety of unattributed quotes taken from the interviews are provided. This is followed by a summary discussion. Detailed findings, conclusions, and recommendations are included in the executive summary portion of the report.

Throughout the course of the study, many "local" (i.e., non-Corps-wide) computer-based management information systems were in evidence, either in

implementation or in various stages of planning. The rate of progress in this arena is very rapid; accordingly, it should be noted that the comments and findings related to a given interview site are based on the date of the interview, and that it is entirely possible (and even likely) that, in the space of a few months between the time of the interview and the date of this report, significant changes in the systems in place can be noted.

This study relied upon the willingness of Corps' personnel at the interview sites to contribute heavily of their time, and their assistance is greatly appreciated.

The views and comments expressed in this report are solely those of the principal investigator.

METHODOLOGY

The purpose of this investigation was to determine what Planning Divisions are currently doing, and what they would like to do, in relation to management information systems. The basic technique selected was that of interviewing a spectrum of individuals at representative Planning Divisions across the country. While the emphasis was on District-level operations, and the originally intended focus was at the study manager level, additional interviews were scheduled at the Waterways Experiment Station and Construction Engineering Research Laboratories in order to determine what models the Engineering and Construction Divisions of the Corps use for microcomputer support and management information.

Initially, documents were reviewed relating to planning and planning management. An exploratory series of interviews were held at the Huntington District to learn about the Corps information management systems and to determine the appropriate structure for a "survey instrument" that could be used in later interviews. Additional interviews were scheduled at the Ohio River Division to examine issues from the Division perspective and, in addition, to learn more about the Corps-wide systems, from Division-level F+A and Program Development offices. An additional set of exploratory interviews were subsequently conducted at the New York District.

As a result of these examinations, a number of factors were uncovered that influenced later efforts:

1) The large, Corps-wide information systems, such as RA/PM and COEMIS F+A, provide an essential context to the local management of planning -- respondents talk in terms of specific reports and report numbers relating to these systems;

2) These systems are not documented for the lay individual, and understanding of them, even on the part of those who work with them routinely, is often limited;

3) Each District, within the context of the overall Corps-wide systems, maintains a "local" system to satisfy Division and District requirements and desires.

Following this effort, an interview guide and survey instrument was prepared, as a checklist for each interview. This survey guide is shown in Appendix A.

Subsequent interviews were conducted on an informal, non-directive basis, and the survey guide was used to ensure that the major topics were covered. In general, a contact individual was located at each Planning Division, who proceeded to set up further interviews with personnel available at the site. The original intent that most interviews be directed to study managers proved to be somewhat erroneous -- many Districts have organized to limit the degree to which study managers must deal with administrative information -- accordingly, many interviews were with higher-level individuals (branch and section chiefs) and with representatives of the administrative groups (e.g., Program Development) directly involved with management information processing.

A typical visit to a site involved one day of interviews. In general, an overview discussion, with a representative of the Planning Chief's office, would focus on the overall structure, function, and workload of the Division, followed by an examination of the basic management tools in use. The history of microcomputers within the Division was then discussed, and attitudes towards microcomputers, and computerized management systems at all levels, were examined. This general discussion was then followed by discussions, usually one-on-one, with individuals at various levels. Wherever possible, documentary information was obtained, in particular, examples of reports. Interview notes were taken by hand; in practice, the survey instrument form was used as more of a checklist. Respondents were in general open and forthcoming, and were assured that no individual attribution of comments would be made.

It became clear, early on in the process, that a "non-directive," open-ended approach to the interviewing was essential. In this approach, the respondents are allowed to take the lead in defining the direction and character of the discussions. This was felt to be appropriate so that the things viewed as important to the respondents would be highlighted. Having two individuals (Walsh and Males) at the interviews was of great value, both providing different perspective and ensuring that topics were covered adequately.

Much of the information obtained, particularly that related to attitudes, was obtained in the informal discussions, rather than through direct examination of documents and reports. It is unlikely that a written survey would be particularly successful in uncovering attitudes towards planning management functions.

In general, it is believed that the interview approach was reasonably successful in providing a picture of overall activities within the Corps. By the later interviews, "closure," i.e., hearing similar things, was being obtained. In that the purpose of the study was not to provide statistical

results, but rather to provide a characterization of the existing situation, the approach and methodology appear adequate.

OVERVIEW OF CORPS-WIDE INFORMATION SYSTEMS

There are essentially three levels of systems for managing planning information in the Corps:

1) The upward reporting Corps-wide systems -- COEMIS, RA/PM, and PRISM -- which are resident on the Honeywell computers;

2) "Intermediate" systems, operating at the Division, District, and downward, such as the "SSAPR" system used in the North Atlantic Division;

3) "Local" systems, operating within the Planning Division, a Branch or below, that provide tracking information (e.g., travel, suspense dates) and may include study manager level of tracking -- increasingly implemented on microcomputers. In some cases, these systems involve downloading information from the Corps-wide systems.

The Corps-wide reporting systems, in particular COEMIS, are the only location at which diverse information comes together -- charges from different Divisions within a District, overhead costs, etc. In addition, these systems are viewed as "truth" (i.e., not necessarily the correct, but the agreed-upon, numbers to be used) in terms of overall measures. Unfortunately, no document was uncovered that explains these systems for the project manager; only detailed technical manuals were located. The following information is drawn from interviews conducted during the course of this study. It should be noted that, in many cases, conflicting information as to the nature of the systems was provided.

COEMIS (Corps of Engineers Management Information System) was originated in SPD, and came in Corps-wide in the early and mid-1970. COEMIS consists of three batch-oriented modules - COEMIS F+A (Finance and Accounting), PA (Personnel Administration), and RA/PM (Resource Analysis/Planning Management). RA/PM is being succeeded by PRISM (Project and Resource Information System for Management). COEMIS F+A handles military, civil, and revolving fund activities. The basis of the system is the ADP work code, which is attached to all transactions. The ADP work code consists of a set of characters describing the organization, appropriation, project, feature and sub-feature, and manner code. A limited number of characters are available for local coding. The limitations on the flexibility of the existing work code for detailed fiscal management of projects at the task level, was mentioned frequently.

Transactions are entered in batch from the Districts (into the District Harris computers) and transferred to the Honeywell. Labor cost is input a time for an individual, which is matched with rates for direct and indirect costs maintained in the Personnel data base. Labor information is closed out in

the Districts by the 20th of each month, thus the monthly reports of costs developed by COEMIS are always behind on actual labor expenses. This shortfall is noted frequently as a problem with the COEMIS reports.

COEMIS uses the Honeywell IDS-1 data management system. A system of "extract" tapes -- actually on-line sequential files -- exists. These files, which contain information organized by ADP work code, allow for other information to be derived from the COEMIS basic information. This derivation is done using commercial "report writer" software on the Honeywell - LOUIS, and AZ7. Many Districts are starting to download this information onto microcomputers for additional massaging and local report development. Extract tapes may have 100,000 records, so the development of subset information at the project level through the LOUIS or AZ7 queries is usually required in order to create a subset file of small enough size to make the downloading practical.

The F+A subsystem of COEMIS maintains information on obligations and expenditures. The basic management report out of COEMIS is the monthly "3011A" report that shows, for each activity and project, the obligations and expenditures for the current period and for the fiscal year to date. These reports are usually made available to the Districts by the 10th of the following month. A labor cost input report is available that shows, by individual and full ADP work code, the labor hours charged to the work code. A labor cost report, which contains labor hours and dollars by individual, is available, but information is "rolled up" (organized) at the project level, not at the full ADP work code level, thus lower-level tracking of personnel charges by task is not straightforward.

The RA/PM system is a batch-oriented project management system that was oriented towards the needs of study managers. It is usually administered by the Program Development Office, whereas F+A is administered by the Resource Management Office. RA/PM incorporates critical path scheduling and percent complete information and provides a series of FB (Functionalized Budget) reports that supply fiscal information organized in different manners, based on the organizational level (District, Division, Branch, Section) by project. Various Districts have used "extract" information from RA/PM to provide graphical displays, in the form of Gantt and CPM charts, of project schedules. RA/PM draws financial information from COEMIS F+A directly. Most "hands-on" operation of RA/PM is done by Program Development, based on input on paper (marked-up and revised output reports) from study managers.

PRISM (Project and Resource Information for Management) is designed as an interactive project management information system, operating on the Honeywell using the "DM IV" transaction processing system. PRISM will replace the batch-oriented RA/PM. It is intended that PRISM be operated directly, hands-on, by study managers, and it is designed to accept updates and furnish reports, on demand. Resource leveling, not a feature of RA/PM, is planned for PRISM. PRISM is currently being tested in selected Corps Divisions. The system was designed prior to the widespread use of microcomputers, and thus, although it can operate using a microcomputer as a terminal, it is not designed for batch updates, which could be prepared on a microcomputer and uploaded to the PRISM system. Concern has been expressed as to the amount of computer resource that will be required by PRISM, and the effect this will have on overall

performance. PRISM should be on-line in abbreviated form at various locations by the end of 1985.

While there is recognition that the COEMIS F+A system does provide utility for the accounting function, and for top-level Corps information, it is not viewed as being relevant to project management. The major drawbacks are seen as the delays associated with the information, the cycle on which the information is based (in particular the labor cutoff on the 20th of the month), and the format and inflexibility of the output reports. RA/PM, which was oriented more directly as a project management tool, has apparently not lived up to its promise as a tool for the study manager. The availability of the extract tapes, as noted above, has provided a clear pattern, being repeated in many Districts, of development of applications based on downloading of this information to microcomputers. In fact, many individuals involved with these applications have expressed the desire to be able to download much additional information not currently made available in appropriate format.

SUMMARIES OF SITE VISITS

Summaries of information obtained at each site visit are presented below. The order of presentation is chronological.

Huntington District

The Huntington District (ORH) was visited on March 6, 1985. This site visit was the initial site visit, and served as a "pilot" effort and learning experience. Conversations were held with the Assistant Chief of Planning, a number of Branch chiefs and project managers, and representatives of the Program Development Office.

The Planning Division at Huntington is organized into the following groups: Office of the Chief; Flood Plain Management/Special Studies Branch; Environmental Planning Branch; Plan Formulation Branch; Navigation/Economics Branch; and Navigation Planning Support Center. The Navigation Planning Support Center provides services throughout ORD, and the Planning Division provides service to other Divisions at ORH; in particular, there is a great deal of interaction with Engineering. A large program of "202" studies (design and construct) on the Tug and Levisa Forks is administered by the Flood Management Branch and receives a great deal of top-level interest.

As of the date of the interview, six IBM microcomputers were on order (one for each branch, plus one for the Chief's office) but had not arrived. The justification procedure was extensive, requiring detailed examination of cost savings, and took approximately six months. The software packages to be acquired were Symphony, Graphwriter II, and PMS-II. One of the major uses of the microcomputers is seen as development of presentation graphics (for budget presentations and public meetings), and one of the computers is being outfitted with a high-resolution graphics board, a six-pen plotter, and a 35mm camera for that purpose. Training will be through outside contracts, and the Navigation Planning Support Center personnel are looked upon as the source of in-house expertise.

A variety of attitudes towards development and use of planning information exist at ORH. At the Chief's office level, RA/PM is used; all projects that interface with other Divisions are in RA/PM. (The predecessor versions of the Corps-wide RA/PM were originally developed at ORH.) A large amount of tabular output and graphical display of schedules are available. A weekly meeting of the Resource Allocation Council (consisting of representatives of each of the operating divisions at ORH) is the mechanism by which coordinated projects are kept on track. Changes to schedules are allowable only at the Chief's office level. Internal projects, those wholly contained within the Division, are not maintained in RA/PM because of the voluminous output that is involved. The Program Development Office at ORH and the RA/PM Coordinator at ORD provide the technical support and operation of the RA/PM system at ORH.

The E1P1 report provides estimates of percent completion and is reviewed and examined monthly. In general, Branch Chiefs review these reports, with input from study managers. Pencil corrections are made and returned to the Program Development Office, which handles inputs, revision, and processing of the information. The E1P1 report is not related to financial progress, although this is strongly desired. Branch chiefs also have their own manual tracking methods, some more extensive than others, and some have expressed the intention of placing these tracking systems on the microcomputers when they arrive. The FB 2.2 report of RA/PM is used by Branch Chiefs to monitor fiscal progress. This report provides organizational and work-year expenses at the Branch level, by project and manner, on a total basis. Users express the desire to have this information monthly as well.

Problems in tracking information are expressed relating to the timeliness of COEMIS reports, the overwhelming amount of data in computer-generated reports, the lack of detail at the task level in RA/PM, and problems in tracking cross-charges. Concern is also expressed relating to potential misuse of microcomputers, in terms of excessive time spent, or high-level professionals doing word processing tasks.

Ohio River Division

Interviews were conducted (by Richard Males alone) at the Ohio River Division (ORD) on March 22, 1985, and March 25, 1985, with representatives of the Planning Division, the Program Development Office, and F+A. The purpose of these interviews was to obtain insight into the perspectives of the Division and to obtain additional background information about the Corps-wide systems, in particular RA/PM, PRISM, and COEMIS F+A.

ORD is an active advocate and user of microcomputers. Strong support from the Chief and Assistant Chief of Planning was identified as a factor in the Division's use of microcomputers. Sixteen Macintosh computers are resident in the Planning Division, the first five of which were acquired in April 1984. (Other divisions at ORD use IBM/compatibles). The major priority for microcomputer usage in Planning was for spreadsheets. Macintoshes were selected based on "user-friendliness," and the use of a 32-bit processor. A full-day training session was held to familiarize staff with the micros. Some users would like additional training. All Macintoshes now have 512k. Twenty out of 22 individuals in the Planning Division are regular users. Report

drafts are frequently developed on the Macintosh, but final copy is done by the Word Processing Center, using Wang equipment. Drafts are transmitted on paper.

ORD encourages Districts to use microcomputers for management purposes but requires quantified cost-saving justifications. It is felt that the Districts should have access to microcomputers, but that they must justify the acquisition. The approval process for District micros goes through District ADP, to the District Commander, to Division ADP, where it is coordinated with the PRIP manager. Although Planning is not directly in the equipment approval process, there is informal coordination. The maximum delay at Division in this approval process was stated to be 30 days. For software acquisition at the Division level, the normal requisition process takes from six weeks to four months, and this is seen as a problem.

The Division uses the COEMIS 3011A report of obligations and expenditures at the study level to track District progress. Only financial information is available on the 3011A report, not milestone or effort reporting. A summary report is prepared. The Division looks at time and dollar completion percentages primarily.

An ISP study was started in April 1985, involving a high-level study team (GS-14 and above) on a full-time, three-month detail. The ISP team includes the Plan Formulation Branch Chief from the Planning Division.

Program Development at ORD maintains RA/PM for the Division. The FB reports available from RA/PM are seen as useful for comparing the Districts. PDO recognizes the difficulty of getting new reports from the system and the long time-frame involved. ORD will examine the results of the pilot installations of PRISM. The lack of resource leveling in PRISM is seen as a problem, and there is concern relating to issues of long-term support of PRISM. There is strong support within Program Development for the use of microcomputer-based systems for management, and they are examining micro-based project management systems. PDO is also using Lotus to maintain manpower requirements of workload by project, on an IBM PC.

New York District

The New York District was visited on April 3, 1985. Interviews took place with the Chief of Planning, various project managers, representatives of the Program Development Branch, and representatives of the Passaic River Basin Study.

The Planning Division at the New York District (NAN) has branches as follows:

Plan Formulation Branch - River Basin Section A and B; Navigation Section, Economic Analysis Section
Passaic Branch
Program Development and Planning Control Branch
Environmental Branch
H & H Branch - Hydrology Section, Hydraulics and Coastal Section

The Passaic River Branch handles a major, ongoing study of the Passaic River Basin. The Program Development and Planning Control Branch handles the administrative and management tools for the Planning Division. Some 40%-50% of the work of the Planning Division is handled through external contracts.

The basic management tool used in the New York District is the Survey/Study Schedule and Progress Report (SSAPR), a formalized system that is required by NAD but is also used internally by choice for local control. The SSAPR system was developed by OCE some 10 years ago. The SSAPR is a system of reporting and meetings. For each project, a SSAPR report provides scheduled and actual milestone dates, obligations, and expenditures, and displays funding available and required for completion. Additional sheets, prepared by each branch or section, provide narrative information on accomplishments since the last report, work programmed for the next period, and identification of problems. SSAPR reports are filled out every two weeks, and a monthly meeting cycle is used in which a "pre-SSAPR" meeting is held to discuss issues to be brought up at the "SSAPR" meeting with the District Engineer, held mid-month. A "post-SSAPR" meeting at the Planning Division level is held a week later for follow-up. The computerized reports of the SSAPR are maintained by the Program Development Branch, using the Harris computer and the Honeywell at Norfolk. The SSAPR reports provide monthly and cumulative fiscal year financial information, but do not break down financial information by cost category. One of the problems cited with SSAPR is that it operates on a different time cycle than the fiscal information; as a consequence, fiscal information in the SSAPR report is not as current as it should be.

In addition to the SSAPR system, project managers are furnished with labor cost input reports (showing hours) and labor cost reports (showing dollars) from COEMIS F+A, which are reviewed for cross-charges. Problems of cross charges are usually resolved at the section or branch chief level. Project managers can recommend that projects be rescheduled, but only the Planning Division chief can authorize the rescheduling. COEMIS reports in general do not go below the Planning Chief.

The Planning Division has four or five IBM microcomputers, all relatively recent acquisitions, with Economics acquiring the first one in the fall of 1984. Microcomputers are shared, with no "private" machines. Program Development provides the majority of support, with little support from ADP. The selection of the computers and software was primarily by ADP. Microcomputers are used mainly for technical work, although the SSAPR reports will be prepared on the micros.

The Passaic River Basin Study has a staff of 25-30 individuals, and is funded at $2.5 million for 1985. The study is largely self-contained, with expertise in all areas. It is rare that groups outside the Passaic Branch charge to the study. The Passaic Study has an internal project manager who manages all funds for the entire group, using Lotus (these applications were developed in the last few months -- prior to that time systems were manual or on the Harris). Project managers are largely "protected" from administrative efforts and concentrate on technical work, with some input to the SSAPR. Applications include a labor estimate, giving scheduled labor hours and costs by month by individual; a contracts monitoring data base, giving contract

description, scheduled, expected, and actual obligation date and contract amount, and a calculation of the shortfall; a labor cost application, giving labor cost for each individual in the Branch; and a breakout, by month, giving scheduled and actual obligations and expenditures in categories of labor, direct support, and contracts. Substudies within the overall study are not tracked via microcomputer, since reporting is not required at that level.

Vicksburg District

Interviews were conducted at the Vicksburg District (LMK) on April 11, 1985, with the Assistant Chief of Planning, various branch chiefs and study managers, and the head of the F+A group.

The Planning Division at LMK is organized into five branches: Flood Plain/Special Studies Branch, Eastern Tributaries, Western Tributaries, Economic and Social Analysis, Environmental Analysis, and Programming and Budgeting Branch. The Programming and Budgeting Branch was set up in 1981 to handle all fiscal matters for the Division, and is viewed as essential to the efficient function of the Planning Division. LMK runs the second largest Planning program in the Corps.

Two primary management reviews exist at LMK: a semiannual LMV Division review of the LMK planning program and a bimonthly internal project schedule review. The semiannual Division review is a formal, day-long meeting in which the full scope of activities is examined, and District Branch Chiefs present status reports to their opposite numbers at the Division. A formal document, containing a number of tables, is prepared for this purpose, and many of the reports are used for internal LMK management as well.

The Project Schedule Review, bimonthly, requires a narrative summary "fact sheet" and a "current status" sheet for each project, showing the status of funds, the current schedule, and the milestone events. This information undergoes a formal review, but the District Engineer is not present at the meeting. The Planning Chief's office meets with the Deputy District Engineer monthly for reviews.

On an ongoing basis, a Division-level "Form 26" for each project -- showing obligations, expenditures, and cash disbursements by cost account number and month for both scheduled and actual figures -- is the basic reporting document and is filled out at the study manager level. Project managers transfer information from reports derived from RA/PM and COEMIS reports to the Form 26. Programming and Budgeting enters data into RA/PM, based on the Form 26s. The so-called "Black Cat" is a locally developed (by F+A) COEMIS monthly report providing expenditures through the end of the previous month, giving actual and year-to-date information by feature and project. This report comes out in an "advance" and final version, and the differences between the two often require adjustment of the Form 26. One branch (Western Tributaries) has developed a spreadsheet version of the Form 26, on an IBM PC, using Supercalc. The Form 26 does not provide a percent complete, which must be calculated by the study manager. An AZ7 report developed from F+A RA/PM data provides additional information, in the form of a breakdown of overhead by types.

Problems and drawbacks have been noted in some of the existing computerized reports of the large-scale systems, e.g., difficulties in getting RA/PM to allocate obligations other than uniformly in a simple manner, and problems with calculation of current month figures on the advance version of the "Black Cat."

There are four computers in the Planning Division (one in Economics -- a NEC CP/M-based machine, one in Environmental, one in Eastern and one in Western Tributaries). A total of nine is planned, one in each of the branches, one in the chief's office, and two in Programming and Budgeting. The new computers are expected to be ITT's; IBM's were desired for compatibility with the Division computers, but the procurement process did not take note of this.

At the time of the interview, a project was proposed with an outside contractor to develop a system placing all LMK management information on a microcomputer, using dBase III. This project was strongly supported by Programming and Budgeting and, at the time of this report, is nearing completion.

The District Chief of F+A has accomplished a project to download information from the COEMIS extract tapes onto a Columbia Data Systems microcomputer, using Cross-talk and Lotus. His intent is to eventually provide cost data directly to users.

Waterways Experiment Station

An interview was conducted at the Waterways Experiment Station (WES) on April 12, 1985. The purpose of the interview was to explore the activities of WES in supporting microcomputer usage and to obtain overall perspectives on microcomputers and management information systems within the Corps.

A microcomputer expertise group has cost-reimbursed funding by OCE to explore the role of engineering workstations. At WES 85%-90% of the microcomputers are IBM compatibles. Technology transfer is provided but not as the basic mission of the group. Training is done only on a limited, case-by-case basis; most training is contracted through the Office of Personnel Management.

Computer programs for engineering functions will be sent out as executable code, primarily in Fortran, and, later, in Pascal and C. Office automation functions use standard packages (e.g., Lotus, dBase).

The microcomputer support group has evaluated a series of microcomputer project management packages and prepared a report describing eight of these packages (the context of evaluation was for engineering activities, not planning studies). In general, capabilities are proportional to price, with the most capable package being Primavera Project Planner ($2,500). No one system is seen as useful at all levels in a District - study managers require detailed reporting, branch chiefs need project status and resource leveling, and higher levels need clear graphic output.

A concern noted relative to PRISM is the amount of computer resource usage that may be required for significant on-line usage; in addition, it is not

designed to allow for easy batch updating based on information uploaded from a microcomputer.

Construction Engineering Research Laboratory

A full-day interview was held at the Construction Engineering Research Laboratory on May 9, 1985. The focus of the interview was on the Construction Management Team (CMT), a group that provides microcomputer support activities to users in the functional area of construction.

The CMT consists of eight individuals and is tasked by Construction in OCE with doing technical support and research, with the main thrust being microcomputer support of construction management, including budgeting and staff reporting. The CMT has been in existence for about a year. It is not specifically tasked with training activities, but some are required by the nature of the mission. Ongoing microcomputer support is similarly a "side-line" activity, seen as subsidiary to the main research and development mission. Such support activities are seen as potentially consuming vast resources and leading to a diminution of the R&D role, and are not desired.

The CMT has produced a Microcomputer Selection Guide that is updated periodically. An "Automation Needs Analysis for Civil Works Operations and Maintenance Activities" Report was published in March 1984. The group publishes "Construction Micro News," a newsletter that is published two to three times a year, with a mailing list of 1,600. The CMT developed and facilitates the Construction Management Users Group (CMUG), a group of approximately 100 individuals involved in microcomputer usage, that meets one to two times yearly. The CMUG is considered to be a "high yield" activity, and CMT favors establishment of such a group at each District and Division. A computerized bulletin board for information transfer has not been operated, based on the assumption that the people most likely to need it are least likely to use it.

The CMT has developed the Construction Information Management System (CIMS), a dBase III application that provides a single source of information on construction contracts. The system is documented and supported by CMT and is tailored (on a cost-reimbursable basis) to specific field office needs. There are four or five versions of CIMS available. Another application developed by the CMT is the Submittal Register, a record of contractor submittals and payments.

The CMT is strongly committed to microcomputer applications. The recommended microcomputer/professional ratio is 1:2 or 3:4. Microcomputers are seen as useful for both defined applications and ad hoc, personalized tools.

Different individuals on the CMT are recognized as "experts" in different arenas, e.g., dBase and spreadsheet applications. There is no intent to develop applications based on BASIC or FORTRAN; Symphony, Lotus, and dBase are used for applications development.

The CMT maintains cognizance of microcomputer-based network management programs, and will continue to do so. As a pilot application of "expert

systems," using a rule-based expert system development tool of Texas Instruments, on a TI computer, a prototype system for selecting network management programs, based on user requirements, has been developed.

The CMT recommends outside training for microcomputer basics, citing the difficulty of obtaining quality training access within the work environment.

South Pacific Division

The Planning Division at South Pacific Division (SPD) was interviewed on June 18, 1985, prior to subsequent interviews on following days at the San Francisco and LA Districts. The Chief of Planning, various Branch Chiefs, and other individuals were interviewed. The Planning Division consists of 36 individuals, many of whom have worked together for a number of years. Many people remarked on the high level of cooperation at SPD. The Division is organized in branches as follows: Economics; Environmental; Special Studies; Coastal Group; Plan Formulation; and Long-Range Planning and Small Projects. One individual within the Planning Division is assigned to each of the Districts, and two economists review overall economic issues.

The Planning Division at SPD is strongly committed to use of microcomputers for management applications. The Chief of Planning was an early advocate. IBM computers were selected, in order to be compatible with activities at OCE and IWR. The first set of microcomputers (one XT, four 2-drive systems) arrived in the fall of 1983. Additional computers acquired since that time include one XT, one PC, and two ATs. At present, 100% of the personnel use microcomputers. Support is obtained internally from four local "experts" or from ADP. The Planning Division supports ADP financially and is in turn supported by ADP. ADP maintains a microcomputer support branch.

The Division tracks District activities based on progress, and on scheduled and actual expenditures and obligations. Districts, at the beginning of each year, are required to lay out studies in terms of expenditures projected by month. A Lotus spreadsheet application (referred to as EXPN) is used to track each project in terms of scheduled, obligated, and available funding and expenditures. Studies are organized by District, and amounts are totaled by District. Deviations from scheduled obligations and expenditures are calculated as percentages. The responsible project managers at SPD are required to update the EXPN directly, from 2101 forms. Efforts are in progress to download information directly from 2101 data stored on Corps-wide systems, using an AZ7 extract developed by ADP, and Symphony.

The "BOGUS" application is a spreadsheet providing milestone dates and funding information (total cost, Federal, and nonFederal share) for each project. Source data is from 2101 and 3011a reports.

A further spreadsheet application, "CONTROL," is used to track suspense dates on all paperwork activities and required responses. The subject, type of action, area of assignment, action code, originating office, date sent, date received, suspense date, response date, time in office, and days before suspense date that action was taken, are all recorded. The system is used as a

management tool -- job performance ratings are based in part on suspense date performance -- and for tracking of the status of requests.

Other applications, primarily on Lotus, include a list of projects reviewed for the Board of Engineers for Rivers and Harbors and a Quarterly Feasibility Report showing favorable/unfavorable reports on each project. An ENR Cost Index program has been developed. An "Executive Calender" dBase application has been developed, and a Lotus travel cost training application is used.

SPD has set up various computer-oriented committees that incorporate all of the Districts, as a coordinating effort.

San Francisco District

A half-day interview with the San Francisco District took place on June 19, 1985. Representatives of the Planning/Engineering Division and the Microcomputer Branch of the Division ADP center were interviewed.

The Planning Division at the San Francisco District (SPN) has 58 personnel, and the overall District is small (180 authorized). Planning is involved in a large number of small project studies, and 12 or 13 major studies. The District does not use RA/PM and does not expect to have the resources to use PRISM.

The Planning/Engineering Division first obtained IBM microcomputers in September 1983. Two Compaqs and two PCs were added the following year. Competition for machines is noted as a problem, and five ATs are coming in.

The original applications were primarily technical, using Lotus. The microcomputer branch of ADP supports only Lotus, Symphony, and dBase III, and thus these are the software packages of choice.

At SPN, the Resource Management Office and the Program Development Office both use microcomputers heavily and handle most of the management information development for the Planning/Engineering Division. Program Development uses an Apple III computer, and RMO uses IBM machines. RMO maintains a number of microcomputer-based systems and reports, using DB Master, including a Project/Survey Milestone Chart, showing for each project and task the monthly actual and scheduled funds; a Project Report, showing in great detail actual and scheduled obligations and expenditures; and an Organization Work Item Tracking report, again providing fiscal information summarized by project work item, by Division. Most of these reports are designed to be "marked up" with corrections and revisions and returned to RMO for input into the various systems.

An internal Project Information Management Study was prepared at SPN. This report was published in May 1984 and contains a detailed examination of information flows and requirements within the District's matrix-oriented organizational framework. The following findings are extracted from this report:

The task of project management must be simplified, since project managers are selected from anywhere within the functional organizations and may have little experience with the budgeting and accounting processes.

An integrated project management information system is needed to support the information needs identified in the study.

The study recommends the development of a Program Development Data Base from which specific project information could be drawn. A number of sample outputs of various microcomputer-based management tools are included.

As a follow-up to this internal study, a report, "Information/ Automation Strategy Project," was prepared by an outside consultant, Arthur Anderson & Company, after a three-month study. The report was issued in December 1984, and endorsed SPN's existing efforts at integrating and coordinating information resources. It recommended the development of an integrated set of applications and a central Program/Project Information Data Base, called "Project Execution Tracking System" (PETS), to be implemented on a microcomputer local area network (NESTAR is recommended), with downloading capability from COEMIS. PETS functions are to include: executive reporting; program planning and execution tracking; project planning, scheduling, and resource allocation; expenditure and scheduling performance reporting; and functional resource planning and reporting. The report recommends use of the Harvard Total Project Manager as the project management tool within PETS. The report recommends the establishment of an Information Resource Management Manager to carry out the implementation plans and provide the ongoing support to PETS. The design is an extension of existing systems developed and maintained by RMO at SPN, and RMO is expected to play an integral role in the use of PETS, with all COEMIS interfaces and data entry maintained by RMO.

The project implementation for PETS is based on a two-and-one- half-year time frame. The proposed structure of PETS includes a Task Level Data Base, oriented around the Harvard Project Manager; an Organization Level Data Base, consisting of 11 fields, oriented towards the Branch Chief; and a 42-field Project Level Data Base (PETSPROJ), providing narrative information for each project. Project managers will work hands on with the Harvard Total Project Manager and create a Data Interchange Format (DIF) file containing planned costs by ADP work code, which will be transferred to Resource Management, where it will be reformatted into a Lotus work sheet application. RMO will create a work sheet, and provide it to the Branch chief, for redistribution of out-month expenditures within each task. The overall system will reside in RMO, and the data structures proposed are derived from those currently in use at RMO in their current application using dBMaster. It is proposed that the PETS system will be run a couple of times per month. Hardware implementation includes the above-noted Nestar network, and a 40 megabyte file server, based on an IBM AT.

Implementation of the first phase of PETS is currently taking place, using in-house resources from the ADP microcomputer branch.

Los Angeles District

The interview at the Los Angeles District (SPL) took place on June 20, 1985. The Assistant Chief of Planning, the computer coordinator, representatives of various branches, and a microcomputer support person from ADP were interviewed in the course of a full day.

The Planning Division at SPL was formed in February 1982. It currently has 134 people and contains some engineering functions. Branches include Water Resources, Environmental, Coastal, Economics, and Planning. The Coastal Resources Branch includes project management, of design through construction. Branches at SPL are relatively independent in their adoption of management systems, particularly as regards microcomputer usage.

Microcomputer usage for management and other purposes is widespread. RA/PM is not widely used. Many individuals are familiar with microcomputers and have them at home. The Planning Division has three XTs, two ATs, and seven PCs distributed among the various branches. Eight new microcomputers are expected in 1985. A Networking Committee in the District is examining overall SPL issues.

The Division has, over the past year, developed a Program Review and Analysis System (PR&A), that provides project and program status reports for program managers at all levels within the Division. A computer coordinator was designated, in the Office of the Chief, to develop and maintain this system. The system is described in a write-up, prepared by the computer coordinator, as follows:

> "PR&A is an integration of milestone information which is manually entered for each project, and fiscal information which is captured from the Honeywell computer. Queries written in the LOUIS II language reside on the Honeywell and provide project obligation and expenditure data from the 72BEXTR cost tape. Output is directed to files which reside on the Honeywell and are captured to floppy discs using the Crosstalk software. The financial data is then imported into a Lotus 123 spreadsheet [on an IBM PC]; macro and data query routines are then executed within Lotus 123 to combine the fiscal data into a report depicting the project schedule data. Graphic display of the financial information are also generated using the graphics feature of the Lotus 123 software."

The PR&A is the primary tool for Planning Division level management. The PR&A was developed because existing reporting systems were seen as incompatible, labor-intensive, and not timely. The F+A reports were the starting point for development of the PR&A. Information is obtained from the extract tapes early in the cycle, before it has been finalized, as the report is summarized, and timeliness is viewed as more important than minor discrepancies. The PR&A report provides a single line for each project, showing scheduled and actual obligations and expenditures, with discrepancies flagged. A graphical display shows cumulative scheduled (current and basic) and actual expenditures for the current and previous fiscal years. The PR&A report has been modified over time to increase its usefulness.

Thirteen hundred records from the Extract Tape are downloaded monthly. If a new project comes on-line, it is necessary to revise the LOUIS query, and the Lotus spreadsheet, to accommodate it. Technical assistance on Lotus techniques was obtained from the Planning Division at SPD. There is some consideration to moving towards a dBASE III environment for the system, to avoid the reformatting of the spreadsheet when changes are desired. The system has been adopted by the Engineering Division and is being modified for Engineering purposes.

An additional report maintained on Lotus shows monthly milestones and quarterly financial data by project, together with remarks on each project. Travel and training are tracked on the Harris, using the INFO data base management system.

The Water Resources Branch has set up a similar, but more detailed, branch-level tracking system, called the Budget Monitoring System. Each engineering service request is assigned a separate ADP work code, to provide low-level tracking. The report incorporates schedule information, showing start and finish date, percent time used, days remaining for completions, and cost information that tracks total and contract costs.

Other branches have specific applications. The Environmental Branch has developed a cost estimation of service costs, using Lotus. A major application for tracking service requests has also been developed by a member of the Environmental Branch and has been in service for about a year. This application is custom-programmed in the "C" language and tracks milestones, contracts, and funds allocations for each service request. Currently, information is updated manually, but modifications to allow for direct downloading and increasing the permissible number of milestone events are desired.

An IBM AT within the Coastal California Study is dedicated to a dBase III application for literature tracking. Technical support for this effort was obtained from the San Francisco District. The Coastal California Study is examining project management programs and is considering Primavera or PMS-80. The Harvard Project Manager is not considered to have sufficient detail, and the Harvard Total Project Manager is viewed as too complex.

In general, training and support are provided locally within the Division. ADP has provided microcomputer support at SPL in the past. Requests for microcomputer equipment are reviewed informally within the Planning Division.

Ft. Worth District

The interview at the Ft. Worth District took place on July 3, 1985. Participating were the Chief of Planning, Branch and Section Chiefs, and various representatives of the branches.

The Planning Division at Ft. Worth District (SWF) has six branches: Flood Control; Basin Planning; Coordination; Flood Plain Management; Environmental; and Economics. The annual budget of the Planning Division is on the order of $3 million, and the Division staff is around 60. The Division does both Civil

Works and Military studies. Studies range in size from small, 90-day initial appraisals, to major basin studies with $2 million budgets over five years.

The Planning Division uses a variety of computer-based tools for management tracking, primarily at the Branch level. The Coordination Branch within the Planning Division is the focal point of Division, with wide management information activities. This branch was set up to provide administrative information and coordinate with Program Development and Resource Management. RA/PM is used to some degree.

PRISM is up and running at SWF, and the Division intends to use it and is hopeful that it will provide worthwhile information. It is intended that PRISM be operated through the Coordination Branch, with Coordination, rather than the project managers, operating the system. Desired information for management is oriented towards study schedules, involving both time and money. In addition, programming of organizational effort over time is seen as a problem. This is due in part to the difficulty of planning for the advent of military work, which often comes with very little lead time.

SWD encouraged the use of microcomputers, and the first set of microcomputers (three Apple IIes) arrived in January 1984. A large number of microcomputers are at the District, primarily in ConOps in the field. The acquisition process was seen as having excessive red tape. The Apples are operated primarily as CP/M machines, with dBase II and Multiplan software. The Apples were hooked into a Corvus network for about a year, but this was recently removed. SWF has switched over to IBM (this took place shortly after the Apples arrived) and the Planning Division now has two IBM ATs (one located in flood plain, and one located centrally). (SWD is only approving IBM AT acquisitions at present.) Consequently, use of the Apples is declining, and they will be provided to the Coordination Branch for project management and tracking activities. Project monies are not generally available for microcomputers, thus PRIP funds need to be programmed. A major environmental impact study, however, has funded the acquisition of a microcomputer-based remote sensing and geographic information system, based on an IBM AT. Software on the ATs includes dBASE III, Wordstar 2000, Lotus 123, Shoebox (a scheduling system), Personal Editor, Fortran, Smartcom, and PC-Talk. The Fixed Disk Organizer menuing system is used.

The Flood Control and Flood Plain Branches are the most active in terms of use of microcomputers for project management. The Flood Control Branch has a system of tracking travel orders and training, developed on the Apples (with support from the Coordination branch). A project financial tracking system, involving downloading from RA/PM and the F+A data base, has also been developed and is run every two weeks within the Branch to get current information to study managers. Wordstar is run on both the Apples and the IBM machines, and a direct transfer from the IBM machine to CPT word processors exists. Study managers are being encouraged to use the micros as word processors but are limited by availability of the machines. Other applications include maintaining a list of milestones of studies in dBase II and historical files of projects and a suspense file. Applications are not documented.

Flood Plain Management has embarked upon a major data base effort for tracking the 40 ongoing studies. An individual within the Branch whose responsibility is that of management support developed the dBase III application, working with the Branch Chief and project managers. The system is organized by stream (40 data items) and study (35 data items per record), with the majority of the data items being scheduled and actual dates for activities. Individuals responsible for each scheduled work item are also noted. Reports are generated showing schedule progress, and personnel workload. Information is updated every two weeks, through marked-up reports by the project manager, with revisions then entered manually. A Historical Record application keeps track of FEMA money by study. A technical services data bank tracks requests for information (requestor, who services the request, suspense dates, etc.). The Operating Budget for the Branch is on Lotus, and 2101 data is being inserted (by hand) into Lotus also. These applications have all been developed within the last six months.

The Environmental Resources Branch does not currently have a computerized internal tracking system. The branch is small (10 individuals), but the involvement in a lot of different types of studies means that budgets are difficult to track. More up-to-date information on expenditures by project is strongly desired.

SWF has performed an ISP study that was completed in April 1984. The Chief of the Environmental Resources Branch served on the ISP study team. The study did not examine the use of microcomputers. The major priorities for information architecture identified in the ISP were improvement of timeliness of system tracking for FTE, development of an automated procurement system, and improvement of the timeliness of COEMIS-F+A. The largest problems identified were associated with the centralized Corps-wide systems -- COEMIS, AMPRS, and RA/PM. An ISP implementation study is just starting.

Training and support mechanisms at SWF rely mostly on internal "experts," who are largely self-taught. One individual is the "expert" on Harris and Honeywell activities, and others are "expert" in various microcomputer software packages. Outside training, in Dallas, has been obtained through the Office of Personnel Management.

COMMENTS FROM THE FIELD

The following comments have been taken from the field interview discussions and represent the comments of various of the interviewees, organized as to subject matter. Clarifications by the author are included in square brackets. These comments are included to show the "flavor" of the attitudes and comments of individuals in the field offices.

Project Management

"We are overwhelmed with information."

"The Corps practices management in retrospect."

"I had a critical path made, but I don't pay any attention."

"90% of the time I can control things."

"My problem is not in having the numbers, it's having them when I need them."

"If we write a DF with costs and a schedule to another Division, the next time we here about it is when we get the product."

"It's hard to get attention on a problem prior to a crisis."

"The Corps practices management by crisis."

"Project management is foreign to the Corps -- the Corps functions organizationally."

"I am firm believer in the Critical Path Method system, but my project managers see it as a burden. I don't know if it is the system, the computer, or people are too busy."

"Somebody in Corps has to figure out if we are doing management at the level of the job, or are we going to transmit it all to OCE."

"I would like to see CPM sheets only when I have a problem on a job."

"I don't see how people get by without an administrative branch."

"We need some help. We are overwhelmed with data. We need quick recall. Higher levels seem to monitor our studies more. A lot of this requirement has come in the last 3 to 4 years, and has taken away a good bit from our time to produce the product."

"We can't afford to change everything every month."

"We're seeing more pressure/emphasis on being better project managers."

"In a District, cross charges are the most significant problem a project manager faces."

"Project managers are judged as 'on-time, on-budget'; a quality product is secondary."

"Project managers want to stop doing a lot of paperwork and funds tracking - they want to be project managers."

"The information [to manage projects] is there, the problem is in getting it into a usable form."

"My problem has not been to watch my money, but how to spend it."

RA/PM and PRISM

"RA/PM became an end in itself. Project Managers were spending most of their time keeping RA/PM going, rather than thinking."

"We don't need PRISM right away - Let someone else prove the concept."

"It's tough to get a new report."

"It takes years to get reports changed -- you need to plead with OCE and the programmer."

"What happens when SWD pulls out of PRISM?"

"RA/PM has too many numbers."

"We are heavily involved in RA/PM, but the end has not justified the costs - it never fits planning."

"Planning is set up primarily for Milestone Reporting and RA/PM does not have it. The simple inclusion of milestone reporting would have brought Planning back into the fold."

"A lot can be done with RA/PM, but nobody knows how."

"We don't use their big system - I don't use PRISM. They are all attempting to over-manage planning projects that cannot be managed at that level."

"If a project manager doesn't get anything from it, the system [RA/PM] will not work."

"There will be a problem with the implementation of PRISM -- RA/PM had so many faults that PRISM will need to be really good -- state-of-the-art -- to get project managers to use it."

"RA/PM is so unwieldy, or has been perceived to be so unwieldy -- I'm not sure which. It's kind of a black box to me. We know it's there, and we know we're supposed to use it."

"Under the current system, the study manager does not have time to get involved with PRISM."

"If they ever get PRISM up and running it will solve a lot of our problems."

"I believe in PRISM - but garbage in, garbage out."

"I see a lot of beneficial uses [for RA/PM information], but over here we get absolutely nothing."

"RA/PM is seen as Program Development's system."

"A microcomputer-based [PRISM] system would be much more acceptable to the user."

The Information Systems Planning (ISP) Process

"The ISP study by OCE is all smoke - it has no foundations."

"There is an over-emphasis on 'corporate data.'"

"The ISP fell into the trap of too much detail."

"When you do an ISP, you get a snapshot of what is important at the time."

"The biggest bitches [revealed by the ISP] are in the large systems, COEMIS, AMPRS, and RA/PM -- things we have no control over."

Documentation

"Anything developed within ADP, we at least document it somewhat."

"Spreadsheets are documented 'very casually' -- for one thing, as soon as you turn it over to someone else, they change it."

"I find it unnecessary to go overboard with traditional documentation."

"The government should start looking at the *problem* of lack of documentation."

"I try to put together a couple of pages to describe what a program does."

ADP

"The average systems man is a lousy salesman."

"ADP has very little programming capability -- the shop is being managed as if they are technicians -- their personalities are oriented that way -- they don't do any 'selling.'"

"The ADP coordinator is open-minded -- his attitude [toward microcomputer acquisition] is 'if it will do what you want it to do, go ahead.'"

"The ADP Chiefs see micros as a threat."

"ADP functions respond to a customer walking in with a defined report (already designed)."

"ADP is not likely to be too knowledgeable."

"We wrestled Symphony out of ADP -- they didn't want to give it to us."

"I had to argue with ADP to get Framework."

"ADP has not kept up with times."

"ADP has to service everybody, and F+A has a lot of clout."

"ADP does not have a support orientation."

"Too many ADP people in the Corps have an 'ownership' idea - 'all ADP belongs to me.'"

"ADP likes to 'brag' on the original purchase price [of computers] -- this is a short-sighted view -- it is not product life-cycle oriented."

"ADP is so strapped maintaining existing systems, they are resource-committed."

"ADP is associated with COEMIS, and other upward-reporting systems -- this attitude carries over."

"ADP operates in an atmosphere of locked doors and windows, with people milling around."

"ADP's mission is to run systems developed by other people, not to develop systems, or do user support."

"ADP has been reduced to a very low level of operation -- they are not practicing computer science."

"If you want information on micros, you have to pry it out of ADP with a crowbar."

Microcomputers

"We're pretty well sold on micros."

"Part of the problem is lack of access -- I need a computer right behind me."

"I want the cheapest computer, as many as I can get hooked together. I want on-line information at my desk. I want it loaded in by others."

"I don't think we can afford everybody developing their own microcomputer system. My concern is that they will set up their own system, and it will not track with anything else."

"They [the branch chiefs] think it will make everybody's job easier -- they don't understand how computers work -- I don't think it will make things simpler."

"We could be warned off doing F+A on micros, because 'there is one F+A system' for the Corps."

"We will not allow dot matrix printing to leave the office."

"I love that thing [my microcomputer] -- they'd have to shoot me first to take it away."

"A lot of people don't realize that you can get a final document off the computer -- it saves a lot of time."

"We will have local project management on microcomputers, then batch to PRISM."

"The things we are doing with microcomputers are far, far beyond what we ever thought we'd be doing."

"People get hung up on these tools [microcomputers] -- they usurp the job descriptions and get fascinated with the niceties."

"Once you start users on dBase III, it is like a contagious disease."

"They love playing with machines."

"We can't demonstrate a need for a PC on every desk. I think we are going there, but our procurement system is oriented towards demonstrating the need first."

"Procurement wants to see somebody using a micro 8 hours a day. They don't realize the front end learning time."

"I wish we could use project monies for micros."

"Up until a few months ago [before we had microcomputers], we were flying by the seat of our pants on project management."

Information Interchange

"I have to call people to find out what they are doing."

"A lot is available, but people don't know it."

"Nobody is interested in communicating with other Divisions."

"Our big problem is technology transfer. We are not willing to pay the price. We don't hire from MIT or Harvard - we don't pay enough."

"Part of Corps policy is that information transfer stops at the Division."

"I would like to know what other people are doing in other Districts. I'm sure that there is a lot of duplication."

"You find out what is going on by nosing around."

Large Systems

"You are spending a lot of time that you should be spending on a report, getting data out of the big systems."

"There is a document explaining COEMIS, but I'm damned if I know what it is."

"There is a need to re-design the ADP work code."

"The large systems are sacred cows."

"F+A is not known for great wisdom, intelligence, or flexibility."

"OCE is committed to 'Big System' designs."

"F+A is strangling the Districts -- there are too many accounts."

"COEMIS is learned from other people, on the job."

"F+A and Programs at OCE don't talk to each other -- they should get together."

"The F+A officer likes F+A, but nobody else does."

"The Directorate of Information Systems is large-system oriented."

"I try to avoid getting smashed by big systems."

"I have yet to see anything coming from the top down that has ever been useful to the field."

"You have to set up a lot of cost keys [to get good tracking through F+A], then make people understand not to give out the cost keys."

"I used to spend a lot of time tracking monies -- is it really worth it, especially since F+A is not really set up to do this."

"The solution is to get the F+A system organized so that you can do things -- you need to be able to put a limit on the amount charged to a cost code."

"From this end, we view those systems as a burden -- we input, but don't get much out at District Level. The general perception is 'a lot of input, not much output.'"

"The system is an inverted pyramid, with the weight resting on the poor SOB trying to use it."

Attitudes

"The big fear at the OCE level is 'How are we going to control E- MAIL.'"

"No computer program will help us with manpower allocation."

"I am concerned that GS-12's will be typing."

"Why get a GS-14 typing? I don't want them doing it - I'll hire a typist."

"Word processing was our last priority -- we didn't want engineers typing."

"There is a degradation of people sitting beyond a keyboard -- no realization of micros as personal productivity tool."

"I believe everybody should know how to type."

"I have no objections to computers, but we use them as an excuse."

"People felt that they were too professional to use microcomputers."

"The thinking on what microcomputers mean is not being done."

"I think it is essential that people design control systems 'or themselves."

"The staff was busy doing paperwork -- I pushed machines so that they would have time to think."

"I fear a typical army operation -- everything will be standardized, rather than an open, free and easy system."

"I foresee a time when we will get too humorless and too standardized."

"My fear is that information systems have become an end in itself."

"God help you when the bean-counters come in."

"People who use microcomputers often forget about their primary duty and responsibility."

Training

"I just wish I had time to play with it [my microcomputer] and get to know it more -- it has all been on the job training."

"It's hard to describe a computer spreadsheet in terms of the Corps career ladder."

"There is no recognition of the value of ADP skills for people outside of ADP."

"You can't finance learning on small studies. The moral is that every district should have a big study -- it advances the technology."

"I've had too many products due, and not enough time for people to grow/expand on computers."

"I would encourage more use of microcomputers by my staff, but right now, we have no time."

"There is a need for basic computer literacy in all functional areas."

"If the Corps is going to be involved, they are going to have to have more people trained in ADP."

"My managers don't have a good understanding of computers -- they see a report and they think you can do anything."

"We are pretty much ADP-ignorant up here -- anything that I know, I've picked up on Saturdays, fooling around."

"I get all my information from manuals."

"We go to [our microcomputer support person] and ask if dBase III can do something -- he has to check the manual -- it would be better if he had time to read, and tell us beforehand what kinds of things it could do for us."

SUMMARY

Within Corps Planning Divisions, there is a clear general desire to simplify the processing of management information. The upward reporting systems (COEMIS and RA/PM) do not satisfy the management information needs of the individuals "on the ground." Two related methods are being developed to cope with this problem: management information is increasingly becoming the province of selected individuals or specialized groups within Planning Divisions or Branches; and microcomputer-based systems are being utilized to handle the information so generated.

Development of such microcomputer-based systems has taken a variety of paths -- some are developed in-house, some are contracted out, some are designed, and some evolve -- but all show commonalities in terms of priorities (tracking scheduled expenditures and obligations) and the character of the technology (generally involving downloading information from COEMIS, and manipulation in Lotus or dBase III). There is a great deal of duplication of effort across Districts, and essentially no information interchange. Even within a Planning Division, there may be numerous "local" systems, operating at the Branch level. These local systems by and large satisfy a single level of information need -- they are not "management information systems," in the sense that information that is useful to lower levels can be entered and used by those lower levels and then extracted, in summarized form, by higher levels of management.

There is a great need for increased information interchange, improved training on the use of microcomputer applications tools to develop specific applications, and application of principles of software engineering to those applications. In addition, the Corps needs to examine the overall issue of microcomputers (and other advanced computer technologies) in the workplace -- as it affects issues of organization, management, productivity, planner skills and career paths, character of work, and information flow. These are issues of great complexity, and it is unlikely that a 'op-down, "regulatory" approach will be workable -- rather, development of a management orientation and workplace style that fosters effective use of these technologies should be explored.

APPENDIX A - Survey Instrument

Information Management by Corps Planners

Date: Site:

Name:

Position:

Responsibilities:

Computer Background:

Current Systems Used:

Manual:

Corps-Wide:

Local (District/Division):

Cross Charges:

Timeliness:

Frequency:

Accuracy:

Ability to Manage Outside Resources:

Quantity of Information:

Clarity of Reports:

Other:

Microcomputer Acquisition/History/Use/Status:

Hardware/Software:

Identified Uses:

Presentation Graphics:

Spreadsheets:

Word Processing:

Planning/CPM:

Data Base:

Applications:

Attitude of Top Management/Division:

Support Systems:

ADP:

Program Development:

Resource Development:

Other:

Sources of Information/Advice:

Knowledge of Activities in Other Districts:

ISP:

PRISM:

Other:

DTIC

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